

CLAIMS:

1. Disc drive apparatus (1) for writing and/or reading information into and/or from a disc (2), comprising:
a controllable motor (4) for rotating a disc (2);
a control unit (90) having a first output (91) for generating a control signal (S_{CM}) for said
5 motor (4);
wherein the control unit (90) is designed to be capable of operating in a FAN mode (SM2) in which said motor (4) is rotated without any writing and/or reading being executed by the disc drive apparatus.
- 10 2. Disc drive apparatus according to claim 1, further comprising temperature measuring means (50) for generating a measuring signal (S_T) indicating a temperature (T) occurring within the disc drive apparatus, the temperature measuring means (50) preferably being arranged for measuring the temperature of a disc drive component;
wherein said control unit (90) has a signal input (95) coupled to said temperature measuring
15 means (50), and is designed to enter said FAN mode (SM2) in response to the measuring signal (S_T) received from said temperature measuring means (50).
3. Disc drive apparatus according to claim 2, wherein said control unit (90) is designed to enter (step 203) said FAN mode (SM2) if, at the completion of a write/read
20 operation, said measuring signal (S_T) indicates a temperature (T) above a first threshold temperature (T_1), for instance 60 °C.
4. Disc drive apparatus according to claim 2, wherein said control unit (90) is designed to monitor said measuring signal (S_T) during a write/read operation, to set (step
25 211) a first flag (FT1) in response to receiving the measuring signal (S_T) indicating a temperature (T) above a first threshold temperature (T_1), for instance 60 °C, and to enter (step 214) said FAN mode (SM2) if, at the completion of a write/read operation, said first flag (FT1) is set.

5. Disc drive apparatus according to claim 4, wherein said control unit (90) is designed to monitor said measuring signal (S_T) during a write/read operation, and to reset (step 213) said first flag (FT1) in response to receiving the measuring signal (S_T) indicating a temperature (T) below said first threshold temperature (T1).

6. Disc drive apparatus according to any of claims 1-5, wherein said control unit (90) is designed to set, in said FAN mode (SM2), a rotational speed of said motor (4) at a predetermined safety value (ω_2) selected for optimum cooling effect.

7. Disc drive apparatus according to any of claims 1-6, wherein said control unit (90) is designed to set, in said FAN mode (SM2), a rotational speed of said motor (4) at a predetermined safety value (ω_2) selected for low audibility.

8. Disc drive apparatus according to any of claims 1-7, wherein said control unit (90) is designed to start (step 215) a first timer (TIM1) on transition to said FAN mode (SM2), and to exit said FAN mode (SM2) after a first predetermined time (p1) determined by said first timer (TIM1).

9. Disc drive apparatus according to claim 2, wherein said control unit (90) is designed to monitor said measuring signal (S_T) during a write/read operation, to set (step 222; step 232) a timer (TIM2; TIM3) in response to receiving the measuring signal (S_T) indicating a temperature (T) above a second threshold temperature (T2) higher than said first threshold temperature (T1), for instance 70 °C, and to enter said FAN mode (SM2) if, after a predetermined time (p2; p3) determined by said timer (TIM1; TIM3), said measuring signal (S_T) still indicates a temperature (T) above said second threshold temperature (T2).

10. Disc drive apparatus according to any of claims 1-9, wherein the control unit (90) is designed to be capable of operating in a duty cycle mode (DCM) in which the control unit (90) is alternatingly operative in a normal mode portion (NMP) during which writing/reading is performed, and in an energy saving mode portion (ESMP) during which writing/reading is temporarily suspended while rotation of said motor (4) is continued.

11. Disc drive apparatus according to claim 10, wherein the control unit (90) is designed to maintain the rotational speed of the motor (4) substantially constant during the duty cycle mode (DCM).

5 12. Disc drive apparatus according to claim 10 or 11, wherein the duty cycle mode (DCM) has a cycle duration selected in the range of 1-10 sec, preferably in the order of about 5 sec.

10 13. Disc drive apparatus according to any of claims 12-14, wherein the duty cycle mode (DCM) has a duty cycle in the order of about 50%.

14. Disc drive apparatus according to any of claims 10-13, comprising temperature measuring means (50) for generating a measuring signal (S_T) indicating a temperature (T) occurring within the disc drive apparatus, the temperature measuring means (50) preferably being arranged for measuring the temperature of a disc drive component; wherein said control unit (90) has a signal input (95) coupled to said temperature measuring means (50), and is designed to monitor said measuring signal (S_T) during a write/read operation, and to enter said duty cycle mode (DCM) in response to receiving the measuring signal (S_T) indicating a temperature (T) above a second threshold temperature (T2) higher than said first threshold temperature (T1).

15. Disc drive apparatus according to any of claims 10-14, comprising temperature measuring means (50) for generating a measuring signal (S_T) indicating a temperature (T) occurring within the disc drive apparatus, the temperature measuring means (50) preferably being arranged for measuring the temperature of a disc drive component; wherein said control unit (90) has a signal input (95) coupled to said temperature measuring means (50), and is designed to monitor said measuring signal (S_T) during a write/read operation, to set a timer in response to receiving the measuring signal (S_T) indicating a temperature (T) above said second threshold temperature (T2), and to enter said duty cycle mode (DCM) if, after a predetermined time determined by said timer, said measuring signal (S_T) still indicates a temperature (T) above a second threshold temperature (T2) higher than said first threshold temperature (T1).

16. Disc drive apparatus according to any of claims 1-15, wherein the control unit (90) is designed to be capable of operating in a first safety mode (SM1) during which writing/reading is performed at a first predetermined safety speed (ω_1).

5 17. Disc drive apparatus according to claim 16 as far as depending on claim 15, wherein said control unit (90) is designed to make a transition to said first safety mode (SM1) in response to receiving the measuring signal (S_T) indicating a temperature (T) above said second threshold temperature (T2), and to make a transition from said first safety mode (SM1) to said duty cycle mode (DCM) if, after said predetermined time determined by said
10 timer, said measuring signal (S_T) still indicates a temperature (T) above said second threshold temperature (T2).

18. Disc drive apparatus according to any of the previous claims, wherein the disc drive apparatus is an optical disc drive apparatus comprising a controllable light beam
15 generator (31), typically a laser;
wherein said control unit (90) has a second output (92) for generating a control signal (S_{CL}) for said light beam generator (31);
and wherein the control unit (90) is designed to switch OFF said light beam generator (31) while operating in said FAN mode (SM2).

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19. Disc drive apparatus according to claim 18, comprising temperature measuring means (50) for generating a measuring signal (S_T) indicating a temperature (T) occurring within the disc drive apparatus, the temperature measuring means (50) being arranged for measuring the temperature of said light beam generator (31).

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20. Disc drive apparatus according to any of the previous claims, further comprising at least one controllable functional unit (40);
wherein said control unit (90) has a third output (94) for generating a control signal (S_{CU}) for said functional unit (40);
30 and wherein the control unit (90) is designed to switch OFF said functional unit (40) while operating in said FAN mode (SM2).

21. Disc drive apparatus according to any of the previous claims, wherein the control unit (90) is designed to be capable of operating in a FAN2 TURNTABLE (SM4) mode in which said motor (4) is rotated without a disc being present.

5 22. Disc drive apparatus according to claim 21, comprising temperature measuring means (50) for generating a measuring signal (S_T) indicating a temperature (T) occurring within the disc drive apparatus, the temperature measuring means (50) preferably being arranged for measuring the temperature of a disc drive component; wherein said control unit (90) has a signal input (95) coupled to said temperature measuring
10 means (50), and is designed to enter (step 272) said FAN2 TURNTABLE (SM4) mode if, in an idle state with no disc loaded, said measuring signal (S_T) indicates a temperature (T) above a threshold temperature (T_1), for instance 60 °C.

23. Disc drive apparatus according to any of claims 21 or 22, wherein said control
15 unit (90) is designed to start (step 273) a fifth timer (TIM5) on transition to said FAN2 TURNTABLE (SM4) mode, and to exit said FAN2 TURNTABLE (SM4) mode after a fifth predetermined time (p5) determined by said fifth timer (TIM5).